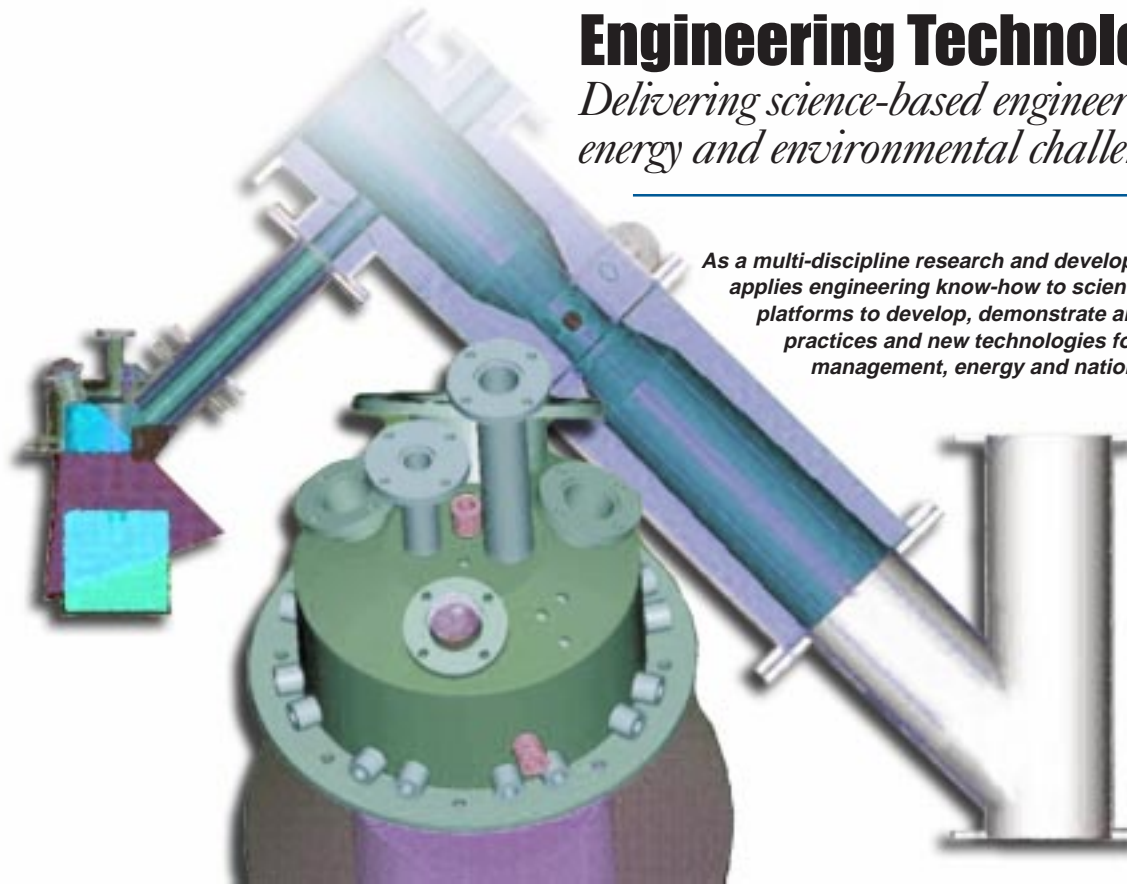


# Engineering Technology

*Delivering science-based engineered solutions to meet energy and environmental challenges*

*As a multi-discipline research and development organization, this division applies engineering know-how to scientific discoveries using test bed platforms to develop, demonstrate and deploy low-risk operational practices and new technologies for DOE's environmental management, energy and national defense missions.*



development of the high level repository, disposing of and transporting spent nuclear fuel, and conducting bench and engineering scale studies in support of disposing high level wastes.

## **Applied Mechanics and Sustainable Design**

This department is known for specialized applied mechanics capabilities in structures, materials and fluids – and for its technological advances in sustainable building design. Its applied mechanics capabilities include nonlinear structural analysis, blast and impact evaluation, piping and pressure vessel analysis, seismic soil-structure interaction, and material aging. These capabilities are used to model and test the structural, thermal and fluid challenges associated with producing nuclear power, operating experimental reactors, simulating accidents or natural hazards, and confining hazardous substances during transport. The department also researches and promotes “green” sustainable building design, construction, operation and disposition – including environmental siting, energy and water conservation – and other indoor environmental considerations.

## **Providing Critical Technical Support**

DOE's environmental management programs at the INL and across the complex are experiencing increased pressure to meet enforceable cleanup milestones within available budgets. This division helps bridge funding and technology gaps by developing superior solutions to everyday problems that delay and stall environmental operations. It achieves science and technology advances by engaging its science and engineering capabilities to resolve dilemmas for waste management, spent nuclear fuel, decontamination and decommissioning, and high level waste programs.

## **Capabilities**

This multi-disciplinary research and development group applies science and engineering to develop, demonstrate and deploy operational practices and new technologies to address environmental challenges associated with DOE legacy waste cleanup activities and newly generated waste- and environmental concerns associated with advanced nuclear and non-nuclear energy systems. It conducts activities in support of DOE Environmental Management, DOE Office of Science, DOE Office of Civilian and Radioactive Waste Management and other federal and non federal customers. The division consists of five departments whose functions include developing environmental remediation and waste management technologies, supporting

Science



*Continued from front*

### For more information

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INL is a U.S. Department of Energy  
national laboratory operated by  
Battelle Energy Alliance



### Environmental Engineering

This department provides technical leadership in management, processing, and disposition of the nation's most challenging waste streams and radiological materials, including resolution of associated regulatory compliance issues. Through management of several national technology development programs for DOE, this department has developed extensive knowledge of DOE and commercial characterization, offgas monitoring and control, and radioactive waste processing and stabilization technologies, with a comprehensive understanding of their applications and limitations. As a result, unique expertise and testbed capabilities in various thermal processing technologies have been developed. Likewise, extensive expertise in management, handling, and disposition of excess radiological materials has been developed. These areas of expertise have been, and continue to be, successfully applied at the INL, as well as other DOE and commercial facilities, in accomplishing environmental cleanup missions.

### Nuclear Materials Disposition and Engineering

This department provides technical services related to spent nuclear fuel handling and disposition needs and transportation of radiological materials. The department has developed spent nuclear fuel packages, and made inroads into new welding and non-destructive evaluation processes. It has developed and is testing an advanced neutron absorber, provided performance assessment and criticality analyses on DOE spent nuclear fuel and is

actively engaged in writing a waste repository licensing strategy. Technical services are provided to resolve spent fuel issues related to packaging, interim and long-term storage, characterization, and repository compliance analysis.

### Process Engineering

A variety of capabilities exist within this department, including the development of methodologies for analysis and treatment of complex waste streams and effluents that result from various INL and DOE missions. The department also has specialized expertise in the development and operation of pilot plants and radioactive remote operations.

The R&D Lab's core competencies are applied engineering of chemical processes, advanced aqueous separations technologies and process offgas monitoring and control.

Significant R&D work has contributed to the development of numerous other chemical flow sheets, studies, and laboratory demonstrations to support proposed waste processing technologies for DOE.

### Systems Engineering

Using a systematic approach to manage challenges, this department focuses on understanding a customer's requirements throughout a given system's lifecycle. The department clarifies and manages system complexities by applying systems engineering principles and practices and integrating other engineering resources. It assists customers in making logical, traceable, and defensible decisions by integrating people and methods using successful decision-making principles. The

department uses a proven systems approach to management when planning, organizing, directing, controlling, and integrating company resources to ensure project success within cost and schedule requirements. Through research and development of systems sciences, it produces new and innovative tools, techniques, and expertise to help government and private industry customers develop solutions for their respective complex challenges.

### Accomplishments

This division claims many accomplishments including contributions to the Lab's ability to meet enforceable milestones related to spent nuclear fuel, high level waste and the preparation of Transuranic waste for disposal at the Waste Isolation Pilot Plant. It's also responsible for the deployment of nearly 200 environmental technologies. It shares the Lab's innovative technologies and practices with Ohio closure sites; applies remote engineering and spent nuclear fuel handling expertise with the Yucca Mountain Project; has conducted DOE's National Vadose Zone Science and Technology Roadmap efforts; and has sponsored national and regional conferences regarding actinide separations. The division also forms and works with international collaborative efforts, including work with Atomic Energy Canada, Limited; United Kingdom Atomic Energy Authority; Central Research Institute of Electric Power Industry of Japan; and, the Australian Nuclear Science and Technology organization.